


Chesapeake Bay Program in Pennsylvania

PA Department of Environmental Protection

Interstate Waters Office

January 2015

PA's Chesapeake Basin

- Over 50 percent of the land in PA drains to the Chesapeake Bay
- The Susquehanna River is the largest tributary of the Chesapeake Bay, providing 90 percent of the freshwater flow to the upper bay and half the total flow into the bay
- PA's Potomac provides an additional 2 percent of the bay's freshwater flow

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PA's Chesapeake Basin

- PA encompasses 35.2 percent of the Chesapeake Bay Watershed (14,358,159 acres)
- Four PA watersheds
  - Susquehanna River (13,298,520 acres, 32.6 percent)
  - Potomac River (1,012,222 acres, 2.5 percent)
  - Eastern Shore (40,262 acres, 0.1 percent)
  - Western Shore (7,155 acres, 0.02 percent)

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TMDL and Chesapeake Bay Program

- Total Maximum Daily Load (TMDL)
  - Published by the U.S. Environmental Protection Agency (EPA)
  - Section 303 of federal Clean Water Act
- Chesapeake Bay Program
  - Partnership
  - Section 117 of federal Clean Water Act

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Chesapeake Bay TMDL Progress

- **December 2010:** Chesapeake Bay TMDL published by EPA
  - Reductions of nitrogen, phosphorus and total suspended solids from Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia and the District of Columbia
  - Goal: All practices on the ground and all permitting activities completed by 2025
  - States and D.C.: Watershed Implementation Plans (WIPs) developed in three phases: 2010; 2012; 2017

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Chesapeake Bay TMDL Progress

- **2017:** Mid Point Assessment Evaluation
  - Evaluation of progress toward 2025 goal
  - Have practices and controls in place that are expected to achieve 60 percent of load reductions needed to achieve applicable water quality standards compared to 2009 levels
  - Update to Chesapeake Bay Watershed Model
  - Inputs, Assumptions, Calibration
- **2018:** Phase 3 WIP
- **2025:** Have all practices and controls installed by 2025 to achieve the Bay's dissolved oxygen (DO), water clarity/SAV, and chlorophyll-a standards.

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Why are WIPs Critical?

- Restoration and protection of PA waters and Chesapeake Bay
- Clarification of states' roles
- EPA "consequences" (Dec 29, 2009 letter) if WIPs not submitted or not acceptable:
  - Expansion of NPDES permitting to sources currently not required to obtain one
  - Objection to permits issued by Pennsylvania
  - Conditioning or redirecting of federal grants
  - Increase in EPA enforcement
  - And others

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PA's Chesapeake Bay WIP

- Created with significant public input
  - Advisory committee meetings, etc.
  - Over 125 individuals volunteered for workgroups
    - WIP Management Team
    - Agriculture Workgroup
    - Urban/Suburban/Rural Workgroup
    - Wastewater Workgroup

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PA's Chesapeake Bay WIP

- Themes that emerged during drafting
  - Success can be achieved by integrating resources and channeling them toward nutrient reductions
  - There is a need for continued discussion on the model and quantifying reductions
  - There is significant commitment in Pennsylvania

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Measuring Progress

- **Two year milestones**
  - **Chesapeake Bay Watershed Model**
    - Best Management Practices (BMPs)
    - Loading (lb/yr) of nitrogen, phosphorous and sediment
  - **Programmatic Milestones – EPA Evaluation**
    - Regulatory and non-regulatory
    - By sector
      - Agriculture
      - Stormwater
      - Wastewater
      - Trading and Offsets
    - Grants, projects and partnerships

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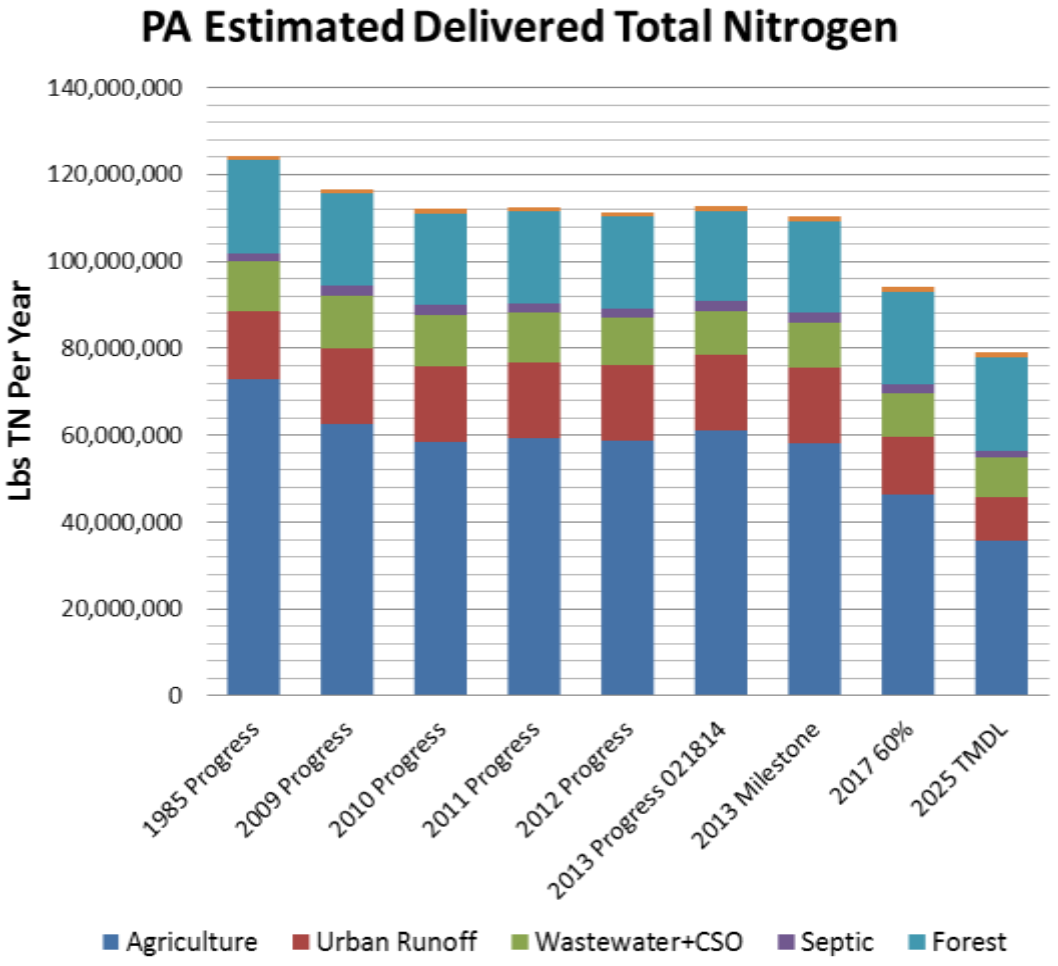
Chesapeake Bay TMDL Progress

Since 1985:

- Completed 27 percent of nitrogen reductions needed to meet the TMDL
- Additional 31.4 million pounds to be reduced by 2025
- Downward revisions made to 2010 data supplied by Farm Service Agency (FSA)



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Chesapeake Bay TMDL Progress

Nitrogen Loads (Millions of Pounds/Yr)

	1985		2012		2013		2017 Checkpoint (60% of WIP)		Reductions by 2017
Total	**124.28**	%	**111.36**	%	**112.71**	%	**102.52**	%	**10.19**
Agriculture	72.79	59%	58.63	53%	61.20	54%	52.69	51%	8.51
Urban Runoff	15.66	13%	17.44	16%	17.18	15%	14.55	14%	2.63
Wastewater and CSO	11.64	9%	11.10	10%	10.21	9%	10.93	11%	-0.72
Septic	1.72	1%	2.07	2%	2.22	2%	2.09	2%	0.13
Forests	22.47	18%	21.08	19%	20.85	18%	21.84	21%	-0.99

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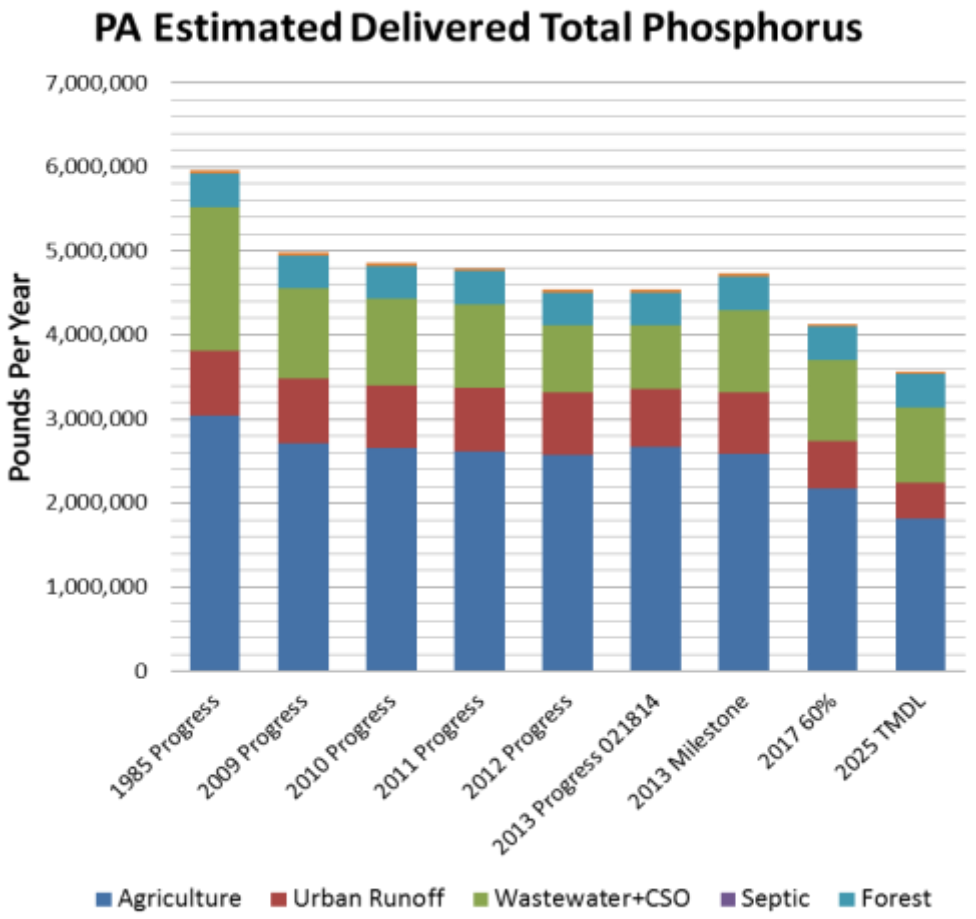
Chesapeake Bay TMDL Progress

Since 1985:

- Completed 58 percent of Phosphorus reductions needed to meet the TMDL
- Additional one million pounds needed by 2025
- 2013 results meet 2013 milestone goal
- Wastewater Treatment Plant (WWTP) Phosphorus loads met 2013 milestone and on track for 2017 midpoint loads



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Chesapeake Bay TMDL Progress

Phosphorous Loads (Millions of Pounds/Yr)

	1985		2012		2013		2017 Checkpoint		Reductions by 2017
Total	**5.957**	%	**4.541**	%	**4.541**	%	**4.400**	%	**0.141**
Agriculture	3.045	51%	2.572	57%	2.663	59%	2.395	54%	0.268
Urban Runoff	0.764	13%	0.751	17%	0.689	15%	0.630	14%	0.059
Wastewater & CSO	1.715	29%	0.787	17%	0.767	17%	0.943	21%	-0.176
Forests	0.432	7%	0.394	9%	0.385	8%	0.418	9%	-0.033

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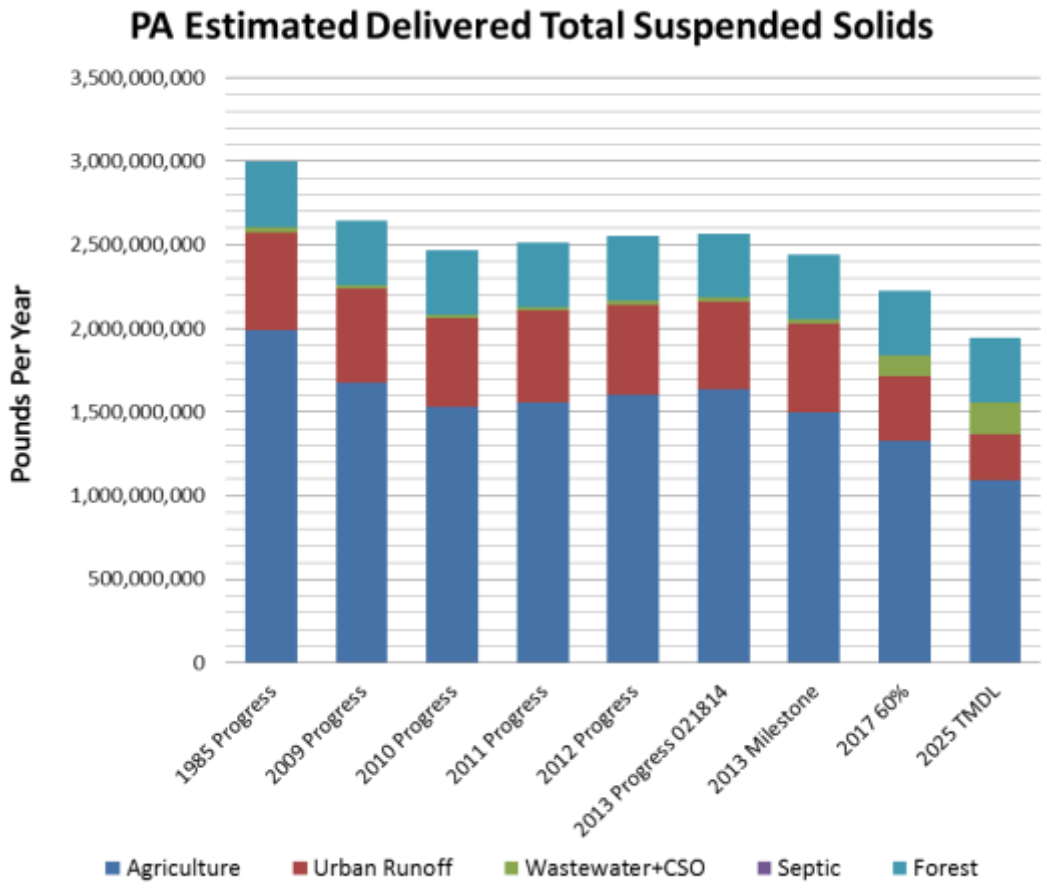
Chesapeake Bay TMDL Progress

Since 1985:

- Completed 40 percent of Total Suspended Solids (TSS) reductions needed to meet the TMDL
- Additional 648 million pounds to be reduced by 2025
- Downward revisions made to 2010 FSA-supplied data



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Chesapeake Bay TMDL Progress

Total Suspended Solids (Millions of Pounds/Yr)

	1985		2012		2013		2017 Checkpoint		Reductions by 2017
Total	**2,998.8**	%	**2,553.6**	%	**2,565.0**	%	**2,353.1**	%	**211.9**
Agriculture	1,990.4	66%	1,602.8	63%	1,636.4	64%	1,431.4	61%	205.0
Urban Runoff	580.6	19%	539.1	21%	526.9	20%	447.0	19%	79.9
Wastewater & CSO	35.1	1%	25.9	1%	24.3	1%	87.5	4%	-63.2
Forests	392.6	13%	385.9	15%	377.5	15%	387.2	16%	-9.7

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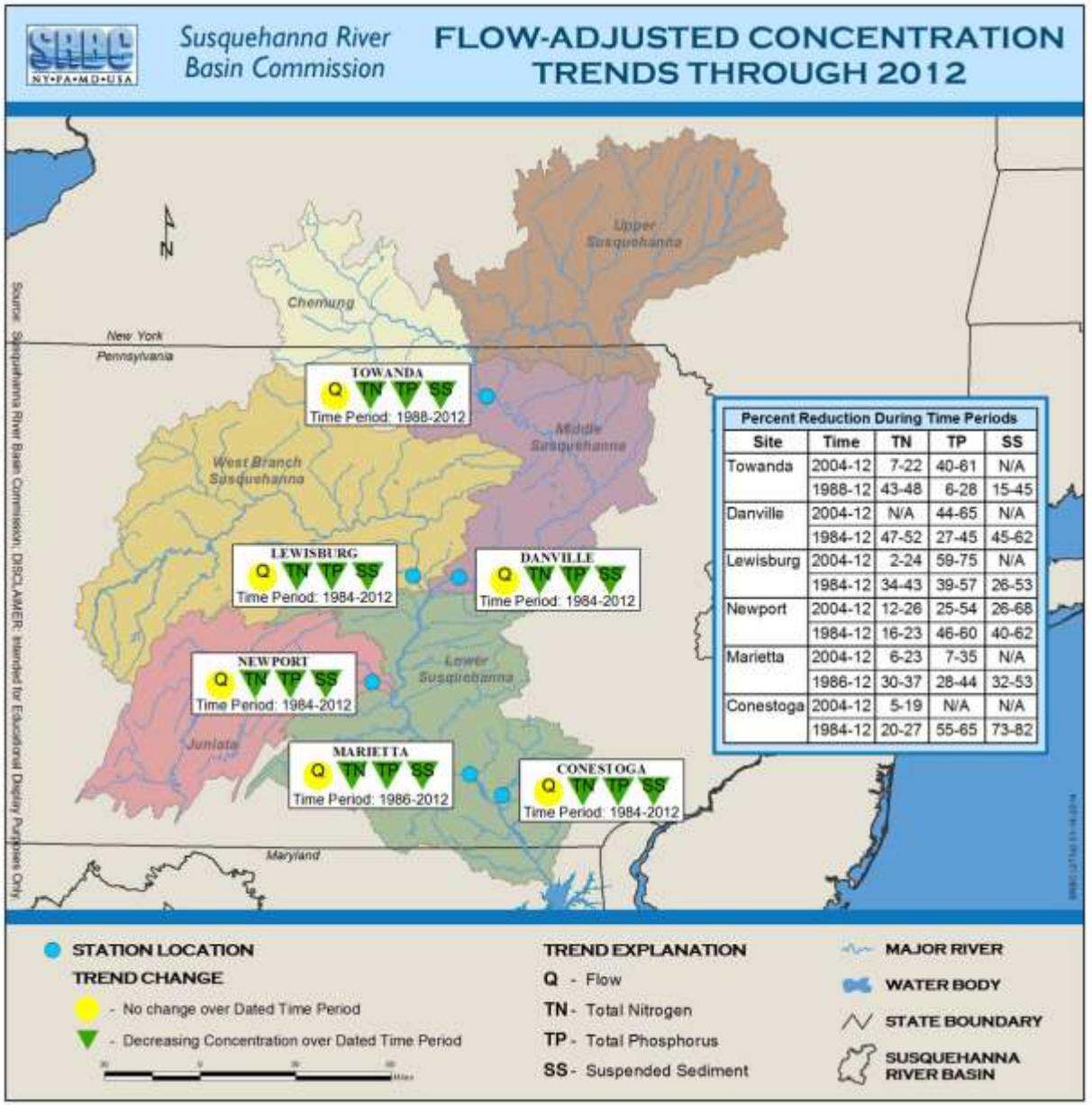
Monitoring


Susquehanna River Basin Commission
FLOW-ADJUSTED CONCENTRATION TRENDS THROUGH 2012
Upper Susquehanna
Chemung
New York
Pennsylvania
TOWANDA
Q TN TP SS
Time Period: 1988-2012
Middle Susquehanna
West Branch Susquehanna
LEWISBURG
Q TN TP SS
Time Period: 1984-2012
DANVILLE
Q TN TP SS
Time Period: 1984-2012
NEWPORT
Q TN TP SS
Time Period: 1984-2012
Lower Susquehanna
Juniata
MARIETTA
Q TN TP SS
Time Period: 1986-2012
CONESTOGA
Q TN TP SS
Time Period: 1984-2012
Maryland
Percent Reduction During Time Periods
Site | Time | TN | TP | SS
Towanda | 2004-12 | 7-22 | 40-61 | N/A
1988-12 | 43-48 | 6-28 | 15-45
Danville | 2004-12 | N/A | 44-65 | N/A
1984-12 | 47-52 | 27-45 | 45-62
Lewisburg | 2004-12 | 2-24 | 59-75 | N/A
1984-12 | 34-43 | 39-57 | 26-53
Newport | 2004-12 | 12-26 | 25-54 | 26-68
1984-12 | 16-23 | 46-60 | 40-62
Marietta | 2004-12 | 6-23 | 7-35 | N/A
1986-12 | 30-37 | 28-44 | 32-53
Conestoga | 2004-12 | 5-19 | N/A | N/A
1984-12 | 20-27 | 55-65 | 73-82
STATION LOCATION
TREND CHANGE
- No change over Dated Time Period
- Decreasing Concentration over Dated Time Period
TREND EXPLANATION
Q - Flow
TN - Total Nitrogen
TP - Total Phosphorus
SS - Suspended Sediment
MAJOR RIVER
WATER BODY
STATE BOUNDARY
SUSQUEHANNA RIVER BASIN

Chesapeake Bay TMDL Progress

- University of Maryland Center for Environmental Science annual report card
- Sectors have made steady progress
- Newly issued WWTP permit limits have reduced point-source phosphorus loads to below 2017 midpoint loading rates
- November 2011 Study released by John Hopkins
  - Analyzed 60 years of Water Quality Data
  - Available at http://releases.jhu.edu/2011/11/03/a-decline-in-dead-zones-study-shows-efforts-to-heal-chesapeake-bay-are-working/

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Chesapeake Bay TMDL Progress

- More aggressive implementation will be needed in other areas to meet 2017 and 2025 goals
- Improve coordination and tracking of the development and implementation of sector programmatic milestones
- Increased support of locally-led and capacity-building projects
- Develop new/updated comprehensive system for BMP reporting and verification
- NRCS Remote Sensing Pilot
- Legacy sediment
- Phase 3 WIP development

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Data Collection: New Approaches

- Presently about 85% of BMP data we report come from Federal sources
  - NRCS, FSA, USDA, NFWF

- Annual crop BMPs are difficult to collect given limited resources
  - Conservation Tillage, Cover Crops and Nutrient Management

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Conservation Tillage

- Through 2005 transect surveys reported by Purdue University's Conservation Technology Innovation Center (CTIC)

- Since 2010 transect surveys conducted by Capital Resource Conservation and Development (Cap RC&D) Council, funded by DEP and reported to CTIC

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Tillage Survey Results

Conservation Tillage Percentage of Acres with Greater Than 30% Field Residue

County	2010	2011	2012	2013
Adams	69.8	69.8	53.0	53.0
Bradford	45.3	45.3	45.3	20.3
Centre	45.3	45.3	45.3	37.5
Cumberland	48.7	48.7	46.0	46.0
Dauphin	64.8	64.8	36.0	44.5
Juniata	45.3	45.3	25.0	25.0
Lancaster	53.0	53.0	45.0	55.0
Lycoming	45.3	45.3	45.3	30.1
Northumberland	45.3	45.3	45.3	79.7
Union	45.3	45.3	75.0	75.0
York	75.5	75.5	55.0	55.0
Average	**53.04**	**53.04**	**46.92**	**47.36**

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Cover Crop Pilot Transect Survey

- Conducted by Capital RC&D this past fall with spring 2015 completion
  - Adams, Cumberland, Huntingdon, Juniata, Union
- Observations included:
  - Predecessor crop, Installation date, crop type, planting method, crop height, manure application

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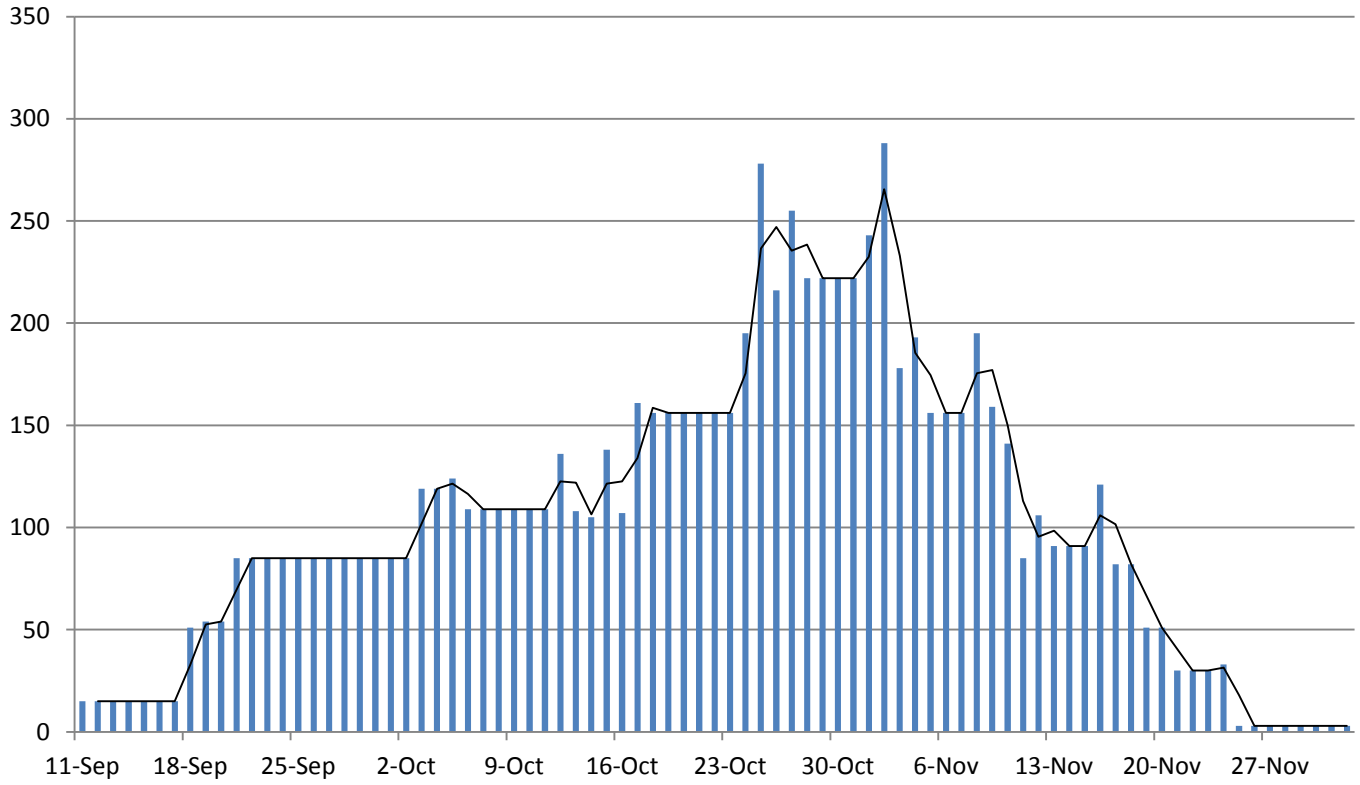
Cover Crop Installation Date

Total Number of Covered Fields by Planting Date



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Cover Crop Survey Preliminary Results

2014 Cover Crop Surveys	Union	Huntingdon	Juniata	Cumberland	Adams
Total Observations	710	702	748	736	774
Total Crop Observations	469*	361	446*	370	421
Total Corn/Soy Observations	388*	348	348*	356	392
Total Cover Crop Observations	172	123	136	137	142
% Cover Crops of Total Crop Observations*	37%	34%	30%	37%	34%
% Cover Crops of Total Corn/Soy Observations*	44%	35%	39%	38%	36%
# Cover Crops Following Corn (%)	80 (47%)	99 (81%)	98 (73%)	100 (73%)	49 (35%)
# Cover Crops Following Soy (%)	83 (48%)	11 (9%)	27 (20%)	25 (18%)	67 (47%)
# Cover Crops Following Small Grain or Other (%)	9 (5%)	12 (10%)	9 (7%)	11 (8%)	25 (18%)

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New Chesapeake Bay Watershed Agreement

Clean Water Act Section 117

Section 117 of the Clean Water Act establishes the Chesapeake Bay Program (CBP) and sets Federal water quality policy specifically for the Chesapeake Bay watershed.

The CBP is a comprehensive cooperative effort by federal, state and local governments, nongovernmental organizations, academics, and other entities that share the mission of restoring and protecting the Chesapeake Bay and its watershed.

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Chesapeake Bay Program

- The Chesapeake Bay Program (CBP) is directed by the Chesapeake Executive Council (EC).
- The Chesapeake Bay Program Office (CBPO), located in Annapolis, MD, provides support to the EC and CBP.
- CBPO is maintained by the U.S. EPA and is supported and staffed by many partners.

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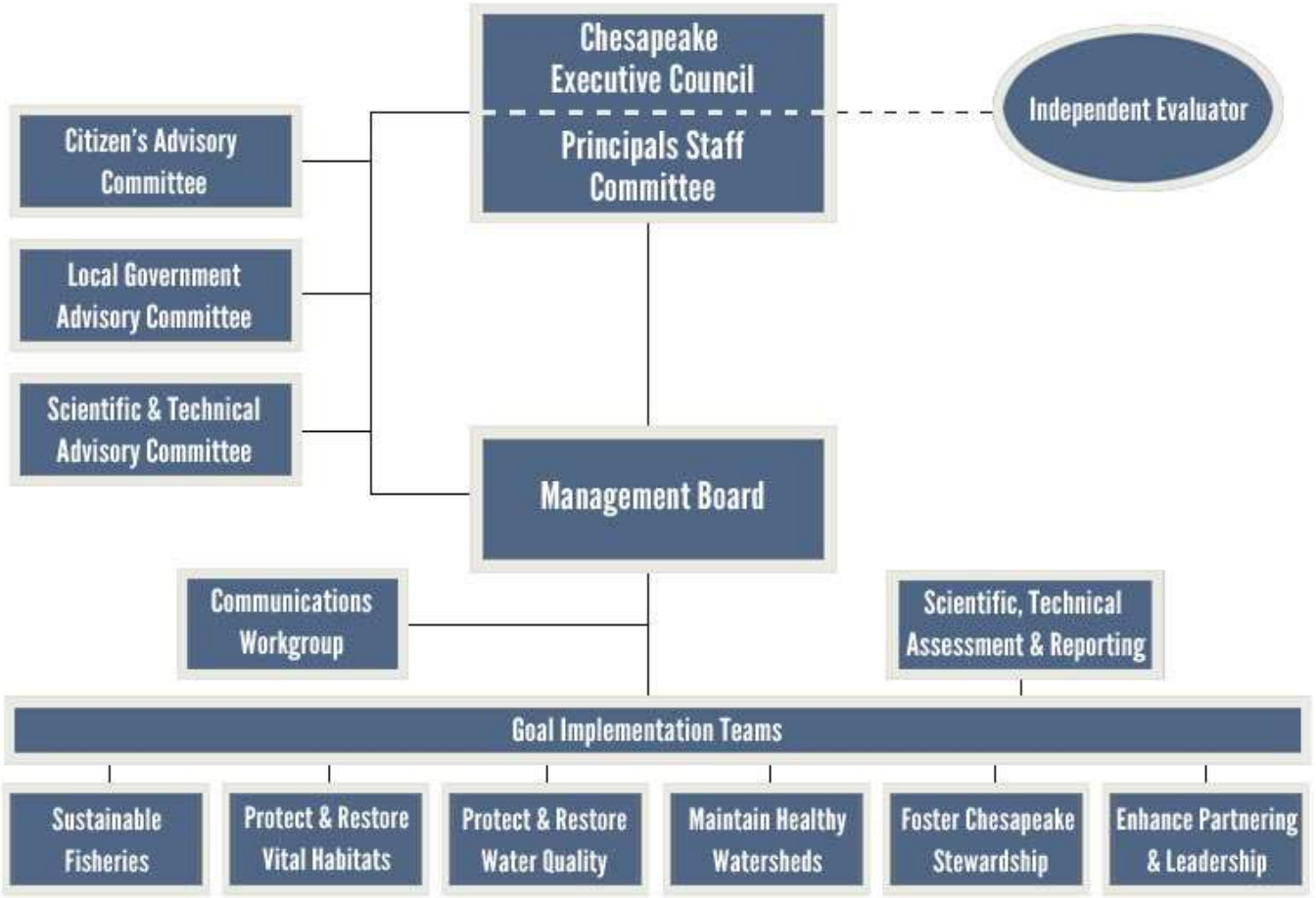
Chesapeake Bay Program



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New Chesapeake Bay Watershed Agreement

- Signed in June 2014, after three year process
- Replaced outdated Chesapeake 2000 Agreement
- Includes Federal Agencies
  - Executive Order (EO) of 2009
- Congressional General Accountability Office called for the "alignment" of the federal EO Chesapeake Bay Strategy goals and the Chesapeake Bay Program Agreement goals
- Agreement signatories eligible to receive funding

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New Chesapeake Bay Watershed Agreement

What's New?

- "Headwater" states (NY, DE, and WVA) are now signatories
- Agreement is shorter than past ones
- Contains goals with focused outcomes
- Management Strategies will be developed for outcomes
- Jurisdictions have flexibility to choose level of participation with outcomes

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New Chesapeake Bay Watershed Agreement

Sustainable Fisheries Goal

- Blue Crab Abundance Outcome
- Blue Crab Management Outcome
- Oyster Outcome
- Forage Fish Outcome
- Fish Habitat Outcome

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New Chesapeake Bay Watershed Agreement

Vital Habitats Goal

- Wetlands Outcome
  - *Black Duck*
- Stream Health Outcome
  - *Brook Trout*
- Fish Passage Outcome
- Submerged Aquatic Vegetation (SAV) Outcome
- Forest Buffer Outcome
- Tree Canopy Outcome

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New Chesapeake Bay Watershed Agreement

Water Quality Goal

- 2017 Watershed Implementation Plans (WIP) Outcome
- 2025 WIP Outcome
- Water Quality Standards Attainment and Monitoring Outcome

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New Chesapeake Bay Watershed Agreement

Toxic Contaminants Goal

- Toxic Contaminants Research Outcome
- Toxic Contaminants Policy and Prevention Outcome

Healthy Watersheds Goal

- Healthy Waters Outcome

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New Chesapeake Bay Watershed Agreement

Stewardship Goal

- Citizen Stewardship Outcome
- Local Leadership Outcome
- Diversity Outcome

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New Chesapeake Bay Watershed Agreement

Land Conservation Goal

- Protected Lands Outcome
- Land Use Methods and Metrics Development Outcome
- Land Use Options Evaluation Outcome

Public Access Goal

- Public Access Site Development Outcome

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New Chesapeake Bay Watershed Agreement

Environmental Literacy Goal

- Student Outcome
- Sustainable Schools Outcome
- Environmental Literacy Planning Outcome

Climate Resiliency Goal

- Monitoring and Assessment Outcome
- Adaptation Outcome

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New Chesapeake Bay Watershed Agreement

Next Steps

- Development of Management Strategies for Outcomes
  - Due June 2015
- Implementation
- Biennial Review and Update of Strategies
- Adaptive Management
- Transparent Public Process
- Extensive PA agency and public stakeholder participation
  - DEP, DCNR, PFBC, DCED

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